The dominant forest stand belongs to productivity class 1 and productivity class 2, which suggests their high productivity. At present average productivity class is 2.5, which means that Yekaterinburg forest stand is relatively very productive.

Forest stand density distribution shows that forest stand in municipal green space is of medium density with an average density of 0.77.

Incomplete forest stand occupies a small area of 267 ha or 1 percent. Medium density forest stand is predominant in all forest districts. Its area is 15389 ha or 60 percent of forested green space. High density forest stand area is 10081ha or 39 percent.

Having analyzed mean valuation factors of the dominant species may conclude that at present the average age of pine stand is 110 years; the mean productivity class is 2.2, which suggests highly productive stand; the dominant forest type is berry pine forest; mean density is 0.73, which suggests it is of medium density and is quite productive; mean increment is 3,3 cubic metres per ha.

Birch stand has high and medium mean valuation factors, such as a productivity class of 2.5, a density of 0.75, mature and overmature forest stand covering 244 cubic metres per ha, forested land stand covering 226 cubic metres per ha, a mean increment of 3.1 cubic metres per ha. The average age is quite old – 73 years. The dominant forest type is berry pine forest, birch forest being secondary forest growth.

*Resume*

This is the first attempt to study the structure of forest land of Yekaterinburg green space in such a way. The data obtained may be used:

to study further the municipal forest using development dynamics monitoring;

The data obtained is the basis for studying forest oxygen productivity and carbon sequestration;

Yekaterinburg municipal administration could use this data when creating or improving the urban development master plan to minimize the damage to natural forest land during the design and construction phases of projects of various applications.

УДК 502.4(470.23)

***M. I. Shevlyakova, S.N. Luganskaia***
***(М.И. Шевлякова, С.Н. Луганская)***
***Ural State Forest Engineering University, Yekaterinburg***
***(Уральский государственный лесотехнический университет, Екатеринбург)***

## THE RATIONALE FOR CHOOSING RESTORATION METHODS FOR MONREPOS PARK NATURAL MUSEUM RESERVE (VYBORG, LENINGRAD REGION)

## (ОБОСНОВАНИЕ НАПРАВЛЕНИЯ РЕСТАВРАЦИИ ТЕРРИТОРИИ ПРИРОДНОГО МУЗЕЯ-ЗАПОВЕДНИКА «ПАРКА МОНРЕПО» Г. ВЫБОРГ ЛЕНИНГРАДСКОЙ ОБЛАСТИ)

*The retrospection method (analogous to Humphry Repton`s in late 18$^{th}$ – early 19$^{th}$ centuries) makes it possible to assess the degree of transformation of a historical site over the period of its existence. The results establish a rationale for choosing restoration methods for landmark landscapes.*

*Метод ретроспекции (аналог работ Х. Рептона, кон. XVIII – нач. XIX вв.) позволяет оценить степень преобразования исторического объекта в течение долгих лет его существования. Результаты работы дают обоснованность методов реставрации памятников садово-паркового искусства.*

At present landmark landscape preservation is of great importance. It includes preservation of cultural heritage, promoting cultural landmarks and using them for research, cultural and educational purposes.

Monrepos, the only rocky landscape park in Russia, is situated on Tverdysh island (the Vyborg Bay,

Leningrad region). It has changed a great deal since it was founded (1788): its artistic appearance has changed, the original ideas and images have become lost to perception, the main architectural features have disappeared, and the surviving features are in poor condition [1, 2].

To form a rationale for its restoration a survey of the area was conducted and the degree of deviation from the original landscape appearance was identified.

The approach is based on the work of Humphry Repton, the English landscape designer of the late 18th – early 19th centuries.

The main point of this approach is the following: modern day photos are superimposed onto the historical images, and differences show changes in landscape. Superimposition of historical and modern day images is called landscape retrospection in this paper.

According to this approach the historically correct elements of Monrepos Park were photographed from the same angle as their historical images. Ten of these elements were supported by detailed information found in archive documents. Pictures 1 to 3 show some of the elements.

This method shows the degree of transformation of a given historical site. The main transformations are shown in Table.

The survey resulted in the following conclusions: The retrospection method makes it possible

Picture 1. Baroness Octavia Nicolay *Monrepos mansion house in 1830*, 1830 **г**.

Picture 2. The mansion house, photo from the same angle 2014 **г**.

Picture 3. The retrospection element of south-east (front entrance) façade of the mansion house

The scope of restoration work

| Name of landscape element | Degree of transformation, % | | | Restoration method |
|---|---|---|---|---|
| | trees and shrubs | relief | structures | |
| The mansion house | 100 | 90 | 80 | Full restoration |
| Narcissus Spring water | 80 | 80 | 60 | Full restoration |
| Broglio brothers' Obelisk | 100 | - | 20 | Reconstruction; restoration |
| The falling stone | 80 | 100 | - | Reconstruction |
| Marienturm pavillion | 60 | 100 | 100 | Full restoration |
| Linden gondola | 100 | 100 | - | Full restoration |
| Paulstein pond | 80 | 40 | 100 | Full restoration |
| Neptune's Temple | 5 | - | 100 | Partial restoration |
| Vainemainen's sculpture | 10 | - | 20 | Partial restoration |
| Ludwigsburg Chapel | - | - | 70 | Conservation |

to assess the degree of transformation of the architectural elements. According to the results of the study one can choose a suitable restoration method (partial, full restoration or reconstruction). Archive documents are not enough for the full restoration of the element. Letters and contemporaries` descriptions may prove useful but they do not create exact visual images.

Therefore it is the combination of archive documents and field survey (landscape retrospection) that creates an effective visual representation to restore the original architectural and plant landscape.

*Literature*

1. Samarin O. *The Restoration of Monrepos: the Environmental Aspect.* St Petersburg: Sakura LLC, Ardis, 2013–2014.

2. Shevlyakova M.I., Luganskaya S.N. The Stand Condition in Monrepos Park natural museum reserve, Leningrad oblast // The rising generation of researchers' contribution to Russia's forest sector: Proceedings of the 10th All-Russian Student Science and Technology Conference. Yekaterinburg. Part 2. 2012. PP. 164–168.